Potential new treatments for hepatitis B, tuberculosis underway

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(From left)Babita Agrawal, Rakesh Kumar and Dennis Kunimoto, a research team with the University of Alberta's Faculty of Medicine & Dentistry, have identified a new class of drugs for the treatment of Hepatitis B and Tuberculosis.

A researcher and his team with the Faculty of Medicine & Dentistry at the University of Alberta have discovered a new class of drugs that could one day be used to treat people with hepatitis B. They have also made a similar discovery for the treatment of tuberculosis.

Working with cultures in his lab, Rakesh Kumar and his colleagues have discovered a new class of drugs for hepatitis B that does three important things: it is effective against the normal strain of the hepatitis B virus; it is effective against the drug-resistant strain and it isn't toxic to healthy cells. He says no one else in the world has identified this class of drugs. These new drugs could be used in combination with other hepatitis B

drugs on the market—at the same time, by themselves or one after the other.

Right now, four drugs are used to treat hepatitis B. Some of these treatments trigger drug-resistant strains of the virus. When the treatment is halted for any reason, it can result in more severe hepatitis B infection. Some of these current treatments are also toxic to patients.

“We want to inhibit the virus without killing healthy cells and that’s what this new class of drugs can do,” says Kumar, an associate professor in the Department of Laboratory Medicine and Pathology. “And we want to inhibit the DNA of the virus with maximum impact in hopes of eradicating the hepatitis B virus altogether.”

Kumar’s findings were recently published in three papers in two prestigious journals: the *Journal of Medicinal Chemistry* and *Bioorganic & Medicinal Chemistry*. He collaborated with two other researchers in the faculty, Lorne Tyrrell and Babita Agrawal, on these papers.

His next steps are to test this new class of drugs on non-human models and people. He thinks human clinical trials could start within three to five years.

Worldwide, there are about 400 million chronic carriers of hepatitis B, a very contagious virus that causes inflammation of the liver. The virus may eventually lead to liver cancer and liver cirrhosis. About 1.2 million people worldwide die each year from the virus. In North America, there are about 300,000 new cases of hepatitis B infection each year, resulting in 43,000 chronic infections and 3,000 deaths, although Kumar says new infections can be prevented with a vaccine.

Kumar has been researching hepatitis B for 15 years. His primary funders are the Canadian Institutes of Health Research and Alberta

Innovates – Health Solutions.

Earlier this year, Kumar, Agrawal and Dennis Kunimoto, another researcher in the faculty, discovered a new class of drugs for treating tuberculosis. Kumar says it is important to find another drug to treat this condition because one third of the world's population has been exposed to TB and the rates of infection are continually increasing, presenting a major global health challenge. Tuberculosis is the most common infection among people living with HIV or AIDS, resulting in death for one third of HIV patients who contract TB.

Current medications used to treat TB are toxic and have led to multiple and an extremely drug-resistant strain of the disease, making TB almost incurable, says Kumar. The new class of drugs Kumar and his colleagues identified is effective in fighting drug-resistant strains of TB, as demonstrated by tests at the cellular level in his lab.

More information: The research findings were published earlier this year in the *Journal of Medicinal Chemistry*.

Provided by University of Alberta